

AY257 Winter 2019 Homework #4: Point-source Photometry

There are a seven CCD FITS files with B- and R-band images of NGC2420 at:

http://www.ucolick.org/~bolte/AY257/HMWK3_2015

1. As always, check headers to make sure the titles are accurate (instrument mode, filter, exposure time)
2. Using DAOPHOT or APPHOT in IRAF, find objects on the frames and measure small-aperture magnitudes. In IRAF: noao.digiphot.apphot or .daophot. I prefer to use the standalone versions. For Macs the executables for the DAOPHOT suite of programs are in the HMWK3_2015 directory along with the DAOPHOT users manual.
3. Average the photometry for the stars measured on the different frames in each band. Match stars in the two filters and produce a color-magnitude diagram B vs B-R.
4. Create a Point-Spread-Function for each frame and run the standard DAOPHOT/ALLSTAR process. Show a final PSF-subtracted image display at +/- 5% of the mean sky level for the deepest frame in each filter
5. Average the PSF-based photometry for each band, match stars again and make a second CMD based on PSF-derived magnitudes.
6. Experiment with ways of “cleaning” the CMD of poorly measured stars and galaxies.
7. Optional: After comparing your CMD with those in the published literature, write a paper on anything interesting and new that you see.

The Astropy photutils package contains aperture photometry and psf-fitting photometry.

<https://photutils.readthedocs.io/en/stable/>

<https://media.readthedocs.org/pdf/photutils/latest/photutils.pdf>

Here is an example of how to carry out a run using pyraf (non notebook):

https://lancesimms.com/programs/Python/python_H4RG/DAOPhot.py

You can also try getting the code up and running stand alone. The files including installation files can be found here:

<http://www.ucolick.org/~bolte/AY257/DAOPHOT15/>